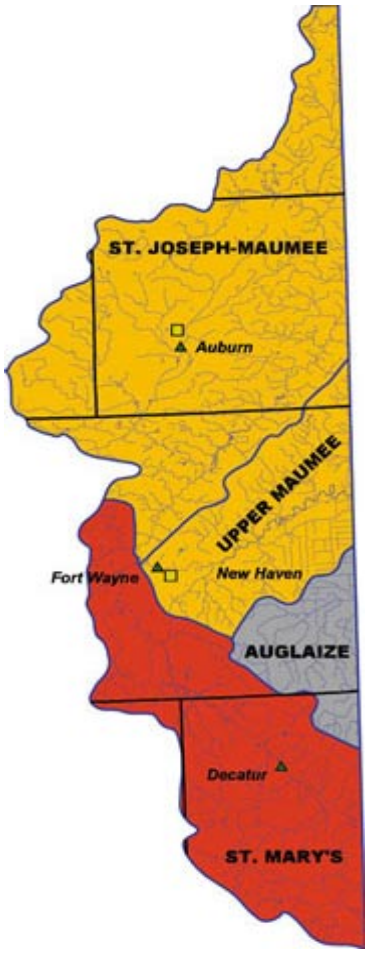
Watershed Restoration Action Strategy for the St. Joseph/Maumee Watershed

Part II: Concerns and Recommendations



Prepared for

Indiana Department of Environmental Management
Office of Water Quality
Watershed Management Section

Prepared by

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Table of Contents

Part II, FOREWORD

The St. Joseph/Maumee Watershed Restoration Action Strategy (WRAS) is intended to be a living document designed to assist restoration and protection efforts of stakeholders in their sub-watersheds. As a "living document" information contained within the WRAS will need to be revised and updated periodically.

The WRAS is divided into two parts: Part I, Characterization and Responsibilities and Part II, Concerns and Recommendations.

The first draft of the St. Joseph/Maumee WRAS was released for public review during the spring of 2002. A 60-day public comment period followed the public meetings at which this WRAS document was introduced. This final version of the WRAS includes public comments received during the 60-day comment period. For comments to be included in the final version, they were required to be written and submitted to WHPA, Inc. (the firm contracted to produce this WRAS) during the comment period.

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Part II, Chapter 1: Concerns and Recommendations

Part II of the Watershed Restoration Action Strategy discusses the water quality concerns identified for the St. Joseph/Maumee Watershed and lists recommended management strategies to address these concerns.

Part II includes:

Section 1 - Water Quality Concerns and Priority Issues Identified by Stakeholder Groups

Section 2 - Water Quality Concerns and Priority Issues Identified by State and Federal Agencies

Section 3 - Identification of Impaired Waters

Section 4 - Priority Issues and Recommended Management Strategies

Section 5 - Future Actions and Expectations

1. Water Quality Concerns and Priority Issues Identified by Stakeholder Groups

The St. Joseph/Maumee watershed contains potential stakeholder groups that have different missions (contact information is included in Appendix C). Many of these groups have a long history of working in the St. Joseph/Maumee watershed. The following discussion briefly describes some of the watershed groups.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS), under the U.S. Department of Agriculture (USDA), provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. The NRCS offers landowners financial, technical, and educational assistance to implement conservation practices on privately owned land. Using this help, farmers, ranchers, and forest landowners apply practices that reduce soil erosion, improve water quality, and enhance crop land, forest land, wetlands, grazing lands, and wildlife habitat. Incentives offered by USDA promote sustainable agricultural and forestry practices, which protect and conserve valuable farm and forest land for future generations. USDA assistance also helps individuals and communities restore natural resources after floods, fires, or other natural disasters.

Soil and Water Conservation Districts

Local Soil and Water Conservation Districts (SWCD) assist land users and residents in the protection and improvement of the local environment. SWCDs can provide technical and financial assistance to local watershed conservation groups.

Hoosier River Watch

Hoosier Riverwatch is a state-sponsored water quality monitoring initiative. The program was started in 1994 to increase public awareness of water quality issues and concerns by training volunteers to monitor stream water quality. Hoosier Riverwatch collaborates with agencies and volunteers to:

- Increase public involvement in water quality issues through hands-on training of volunteers in stream monitoring and

cleanup activities.

- Educate local communities about the relationship between land use and water quality.
- Provide water quality information to citizens and governmental agencies working to protect Indiana's rivers and streams.

The Nature Conservancy - Upper St. Joseph Field Office

Since 1992 The Nature Conservancy has operated a Fish Creek Project Office. The Upper St. Joseph River Project is a natural expansion of the Conservancy's work in this region. The project area includes Fish Creek and the St. Joseph River upstream from Fish Creek. Recent surveys have identified the East Fork of the West Branch of the St. Joseph River as having a mussel community with near equal quality to that of Fish Creek. The total project area of the St. Joseph River is more than 350,000 acres. Initially The Nature Conservancy will focus its efforts on Fish Creek and the East Fork of the West Branch, reducing the project area to 105,000 acres.

Wood-Land-Lakes Resource Conservation & Dvlpmnt

Wood-Land-Lakes is a six-county natural-resource-based volunteer organization in northeastern Indiana. Wood-Land-Lakes is Indiana's newest Resource Conservation and Development Area, established in 1996. RC&D is a unique process that helps people protect and develop their economic, natural, and social resources in ways that improve their area's economy, environment, and quality of life. Local RC&D Councils provide a way for people to plan and implement projects that will make their communities a better place to live. Wood-Land-Lakes accepts conservation easements, protecting farmland, woodland, pastureland, and wetlands. They have several educational programs and water quality-related projects, which include capping an abandoned landfill, participating in Hoosier RiverWatch, and promoting alternative wastewater treatment.

Allen County SWCD

Promoting the adoption of Best Management Practices (BMPs), such as no-till and other high residue conservation tillage systems, in an effort to reduce the amount of sediment, nutrient and pesticide runoff, remains a very high priority for both the Allen County and the Adams County SWCD . Their most recent effort is two-fold, the first component is conducting a research and demonstration farm, known as the Conservation Tillage Center of Excellence, partially financed by Monsanto Life Sciences Company. The second component was implementation of Phase I of a 319 project (ARN 99-222) which is providing farmers with the opportunity to conduct on-farm evaluations of new technologies and innovations in conservation tillage equipment and agronomic practices. ARN 99-222 began in August 1999 and is scheduled to be completed by January 10, 2002. To date many aspects of that project have been very successful.

The Allen County SWCD has submitted a grant proposal that would support Phase II of the Districts' effort to reduce sediment, nutrient and pesticide loading from crop production with priority given to BMPs pertaining to Core 4 objectives. The grant would expand the effort presently underway through both the existing 319 grant (ARN 99-222) and the Conservation Tillage Center of Excellence research and demonstration farm. Both of these projects showcase alternative tillage systems and related agronomic practices that incorporate conservation tillage and sound nutrient and pesticide management techniques.

The proposed 319 project would continue to provide conservation tillage equipment to farmers interested in evaluating conservation tillage systems. Additionally, Phase II would provide cost-share assistance to farmers for modification of their planting, tillage, and/or harvesting equipment to allow them to effectively implement conservation tillage and/or nutrient and pest management on their farms. The project would also continue to provide educational opportunities for farmers and others to learn more about conservation tillage and/or nutrient and pest management through field days and winter meetings.

St. Joseph River Watershed Initiative

Formed in 1996, the mission of the St. Joseph River Watershed Initiative is to develop partnerships to promote economically and environmentally compatible land uses that improve water quality in the St. Joseph River Watershed. Since the size of the St.

Joseph River Watershed is so large compared to the size of the Initiative, the St. Joseph River Watershed Initiative is taking an unique way to manage its watershed. The Initiative has taken the position as coordinator and will use its resources and expertise to identify sub-watersheds. Through water sampling, the Initiative will be able to pinpoint which sub-watersheds will require corrective actions. These corrective actions will be achieved with assistance of public education, cost assistance, and state and federal conservation programs. Once the Initiative has instituted the corrective actions within the sub-watersheds, the Initiative will help develop sub-watershed groups that will carry out these actions. The Initiative would then act as a liaison to federal/state governments and mediator to the public that will involve fund raising and educational information for the public. The Initiative will continue its water-sampling within the watershed, as well as provide any technical information and support needed by the sub-watershed. The Initiative developed the St. Joseph River Watershed Initiative Watershed Management Plan to provide guidance to the Initiative and its Board of Directors.

Dekalb County USDA-NRCS

The Dekalb County NRCS and SWCD have had two projects funded by 319 grants which addressed *E. coli* contamination. One project worked on developing a wetland on-site waste disposal system, and ended in 2001. The other was a demonstration project replacing failed septic systems, and is just coming to an end.

Steuben County USDA-NRCS

The Steuben County NRCS has restored or enhanced a number of wetlands in the Fish Creek Watershed in the southeast corner of the county. These projects have been financed through the Wetlands Reserve Program, the Conservation Reserve Program, and money from an oil spill nearby. The NRCS also cooperates with The Nature Conservancy to offer technical assistance to landowners.

Part II, Chapter 2: Water Quality Concerns and Priority Issues Identified by State and Federal Agencies

This section presents the combined efforts of state and federal agencies, and universities (such as IDEM, IDNR, USDA-Natural Resources Conservation Service, Ohio River Valley Water Sanitation Commission, Purdue University, Indiana University, Indiana Geologic Survey, and US Geological Survey) to assess water quality concerns and priority issues in the St. Joseph/Maumee Watershed. This multi-organization effort formed the basis of the Unified Watershed Assessment for Indiana. At this time, the Unified Watershed Assessment has been completed for 1998 and updated for 2000-2001.

Indiana's Unified Watershed Assessment (UWA)

The UWA workgroup gathered a wide range of water quality data that could be used to characterize Indiana's water resources. These data were used in 'layers' in order to sort the 8-digit HUC watersheds according to the present condition of the water in lakes, rivers, and streams. The workgroup used only those data which concerned the water column, organisms living in the water, or the suitability of the water for supporting aquatic ecosystems. Each 'layer' of information/data was partitioned by percentiles into scores. The scores ranged between one and five, with a score of one indicative of good water quality or minimum impairment, and a score of five indicating heavily impacted or degraded water quality.

The data layers used in the 1998 and the 2000-2001 update include:

- Lake Fishery: Large-mouth bass community information for lakes
- Stream Fishery: Small-mouth bass community information for streams
- Aquatic Life Use Support: The "livability" of the water column for aquatic life, determined from evaluation of chemical and physical water data, and assessment of aquatic life
- Fish Consumption Advisories: Site specific advisories based on current data
- Fish Index of Biotic Integrity: Based on fish community diversity and fish health
- Qualitative Habitat Evaluation Index: Measure of whether the aquatic habitat is suitable for diverse communities, based on visual observations
- Lake Trophic Scores: Indicator for the rate at which a lake is 'aging' due to inputs of nutrients and other factors
- Sediment Potential: Indicator of potential sediment input to waterbodies in the watershed

The sources and additional information for these data layers include:

- Lake Fishery: From IDNR fisheries surveys of lakes and reservoirs from 1972 to 1994. Raw scores were averaged for all lakes in the watershed
- Stream Fishery: From IDNR fisheries surveys of streams from 1970 to 1994. Raw scores were averaged for all streams in the watershed

- Aquatic Life Use Support: IDEM, Office of Water Quality, Assessment Branch
- Fish Consumption Advisories: ISDH and IDEM, Office of Water Quality, Assessment Branch
- Fish Index of Biotic Integrity: IDEM, Office of Water Quality, Assessment Branch
- Qualitative Habitat Evaluation Index: IDEM, Office of Water Quality, Assessment Branch
- Lake Trophic Scores: Indiana Clean Lakes Program through IDEM, Office of Water Quality, Assessment Branch. This score was based on information gathered from sampling conducted in the 1970's and 1980's

During summer 1999 the UWA workgroup used additional layers of information to identify the resource concerns and stressors for each of the 361 11-digit watersheds in Indiana. Examination of the human activities that have the potential to impact the ecosystem will help planners to focus on those areas where restoration may be most critical. Organizations can identify opportunities to use their programs and resources to address those areas.

This focusing process will illuminate areas where the interests of two or more partner agencies may converge. It is intended that this will lead to more effective allocation of resources for restoration and protection activities. At the local level, this information can assist groups to prioritize watershed activities and provide some discussion points for planning.

This amended assessment has the following benefits:

- Provides a logical process for targeting funds, which may be expanded or updated without changing the basic framework.
- Provides information at a finer resolution (11-digit hydrologic units) to agencies and local groups interested in watershed assessment.
- Identifies data gaps.
- Can be used as a compliment to other assessments, such as the 305(b) Report and 303(d) List.

Table 2-1 and Figure 2-1 show the results of the 2000-2001 UWA for the St. Joseph/Maumee watershed (NRCS & IDEM 2000).

Part II, Chapter 3: Identification of Impaired Waters

Section 303(d) of the Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with federal technology-based standards alone. States are also required to develop a priority ranking for these waters taking into account the severity of the pollution and the designated uses of the waters. Indiana's 303(d) list was approved by EPA on February 16, 1999.

Once the Section 303(d) list and ranking of waters is completed, the states are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with the water quality standards. The TMDL is an allocation that determines the point and nonpoint source (plus margin of safety) load reductions required in order for the waterbody to meet water quality standards. IDEM's Office of Water Quality has and continues to perform point source waste load allocations for receiving waters. Part I of the WRAS briefly outlines IDEM's strategy for developing TMDLs.

Table 0-1 shows the St. Joseph/Maumee Watershed waterbodies that are on Indiana's 1998 Clean Water Act Section 303(d) list submitted and approved by EPA (IDEM 1998, Figure 3-1). The 2002 draft 303(d) list has been completed and the final list will be released in October 2002. The draft 2002 list is not included in this document, but is available from IDEM's Office of Water Quality (http://www.state.in.us/idem/water/planbr/wqs/303d.html)

Part II, Chapter 4: Priority Issues and Recommended Management Strategies

Part I provided the existing water quality information for the St. Joseph/Maumee Watershed and Part II lists priority issues and concerns from local, state, and federal stakeholders in the watershed. This section pulls together the priority issues and concerns held by all stakeholders and recommends management strategies. Underlying all discussions of priority issues and concerns is the fact that improving water quality in the St. Joseph/Maumee Watershed will also enhance the natural and recreational values of the St. Joseph River and Maumee River . Each subsection below focuses on a single priority issue.

4.1 Data/Information and Targeting

The success in restoring water quality in the St. Joseph/Maumee Watershed is fundamentally based on identifying the specific geographic problem areas; identifying all sources contributing to the impairment of the waterbody; and quantifying the contribution of a pollutant by each source.

Recommended Management Strategy 1: Numerous data collection efforts are ongoing in the St. Joseph/Maumee Watershed. This information should be used in prioritizing and targeting specific problems and geographic areas in the watershed. The scale at which targeting and prioritization should occur is the 14-digit HUC watershed area (Figure 2-2 of Part I). Targeting and prioritization will require input from stakeholders living in those geographic areas. The purpose of prioritization and targeting is to enhance allocation of resources in the effort of improving water quality.

Recommended Management Strategy 2: Through the development of Total Maximum Daily Loads (TMDLs) for impaired waterbodies in the St. Joseph/Maumee Watershed, all sources contributing to the impairment of a waterbody will be identified and quantified in terms of their contribution to the waterbody. This includes gathering more data and information on nonpoint sources of water pollution. Throughout the TMDL process, information and feedback from watershed stakeholders will be required in order to generate appropriate allocation scenarios. The result of developing TMDLs will be an understanding of the impact of nonpoint sources on water quality in the watershed.

4.2 Streambank Erosion and Stabilization

The cutting and erosion of streambanks within the St. Joseph/Maumee Watershed is a major concern. This cutting and erosion increases the sediment load in waterbodies and directly impacts the scenic and recreational values of waterbodies in the St. Joseph/Maumee Watershed. Streambank cutting and erosion is often a function of many factors that include stream energy and velocity, flooding, and land management. Increased drainage in headwater streams and ditches increases stream energy during rainfall events and often leads to increased streambank cutting and erosion downstream. Land clearing and urban development also impact volume and velocity of runoff. Hence, this problem is not easily solved.

Recommended Management Strategy 1: Structural stabilization of specific streambank areas in the St. Joseph/Maumee watershed may solve problems on a temporary basis. However, a comprehensive understanding of drainage, stream flows and energies, and land management practices is required to adequately approach this problem. Conservation partners (local, state, and federal) are actively working within their specific geographic areas (typically at the county level); however, this may not facilitate solving the streambank cutting and erosion problems because efforts may not be coordinated between headwater and downstream areas. For example, drainage should take into account the work and efforts of downstream partners to reduce flooding and streambank cutting. Conservation efforts should be in the context of watersheds and span county boundaries in order to account for downstream impacts. Local Drainage Boards, Planning and Zoning Boards, and County Commissioners could effectively address this issue by involving local stakeholders in the decision making process and approaching the issue on a watershed basis.

4.3 Failing Septic Systems and Straight Pipe Discharges

Local county health departments and other stakeholders have identified failing septic systems and straight pipe discharge from septic tanks as significant sources of water pollution in the St. Joseph/Maumee watershed. Straight pipe discharges from septic tanks and septic tanks connected to drainage tiles are illegal (327 IAC 5-1-1.5); however, these practices still exist in the St. Joseph/Maumee watershed.

Recommended Management Strategy 1: The direct impact of communities discharging their septic tank effluent to waterbodies needs to be adequately characterized. This will involve coordination between the Office of Water Quality, local health departments, Indiana State Department of Health, and other stakeholders. The choice to eliminate the illegal discharges will be a cooperative effort between homeowners and local, state, and federal stakeholders.

Recommended Management Strategy 2: Local planning, zoning, and health ordinances could be adopted or strengthened to address this problem during new development. Existing local ordinances could be enforced more vigorously to correct problems with existing systems. Both of these strategies will require input from local stakeholders.

Recommended Management Strategy 3: An education/outreach program on the health and environmental risks of septic system discharges, system maintenance, and system function would provide homeowners and others with basic information to better understand the impacts of inadequate systems. This kind of education effort would involve local health departments, Indiana State Department of Health, IDEM, and other stakeholders. For example, the Arrowhead Country RC&D in northwest Indiana is working on a project to demonstrate proper septic system installation.

4.4 Water Quality - General

The Clean Water Act Section 303(d) list presented in Chapter 3 lists impaired waterbodies for the St. Joseph/Maumee watershed.

Recommended Management Strategy: The Clean Water Act requires states to complete TMDLs for waterbodies listed on the Section 303(d) list. The Office of Water Quality is currently evaluating and exploring the modeling process and data needs required to complete TMDLs for the Section 303(d) listed waterbodies. Completion of a TMDL will involve loading allocations of a pollutant to both point and nonpoint sources. The development of TMDLs will involve meetings with stakeholder groups linked to the Section 303(d) waterbodies. As TMDLs are developed, this Watershed Restoration Action Strategy will be amended to incorporate the final TMDLs.

4.5 Fish Consumption Advisories

As noted in Part I and Part II, fish consumption advisories are concerns within the St. Joseph/Maumee watershed.

Recommended Management Strategy 1: In many cases, the source of the contamination is unknown and may be from atmospheric deposition or some unknown discharge. To address this concern, the cause or source must be identified. Until that is accomplished, the fish consumption advisories should be followed.

4.6 Nonpoint Source Pollution - General

Nonpoint source pollution contributions are often difficult to assess or quantify. They can include sediment deposition from soil erosion, nutrient runoff from animal wastes and commercial fertilizer, herbicide and insecticide runoff, and oil or fuel waste runoff. Degraded wetlands may also contribute to nonpoint source pollution, as their capacity for abatement of runoff and the associated pollutants is diminished or lost. Nonpoint pollution can emanate from agricultural as well as urban lands. Currently, loadings of nonpoint source pollutants to water are often inferred by examination of land use practices, without actual measurements. In addition, the actual water quality impairments related to nonpoint source pollutants have not been well characterized in the St. Joseph/Maumee watershed. Finally, very few regulatory control mechanisms exist to control nonpoint source pollution.

Recommended Management Strategy 1: Through the TMDL development process, the Office of Water Quality will identify, assess, and quantify nonpoint source pollutant loadings to impaired waterbodies. In order to accomplish this task, the Office of Water Quality will work closely with local, state, and federal stakeholders at the watershed and subwatershed level. Loading scenarios for nonpoint source pollutants will be developed by the Office of Water Quality and reviewed by local, state, and federal stakeholders. Implementation of nonpoint source controls will involve a blend of funding assistance and regulatory action, where applicable.

Recommended Management Strategy 2: Numerous funding mechanisms, such as Conservation Reserve Program, Environmental Quality Incentive Program, Lake and River Enhancement program, and 319(h) grants, exist to promote practices to reduce nonpoint source pollution in the watershed. To more efficiently and effectively address nonpoint source pollution in the watershed, the prioritization and targeting discussed previously in Part II should be used to allocate further application of resources.

Recommended Management Strategy 3: The management of urban nonpoint sources can be addressed through effective land use planning and site design. Designs that incorporate less impervious area and more natural infiltration areas have proven effective in reducing urban nonpoint pollution. Local stakeholders working with local planning and zoning authorities, and developers, should implement more stringent site design requirements to reduce nonpoint source contaminants. This effort would be supported by the state and federal stakeholders.

Recommended Management Strategy 4: Practicing the following management measures for NPS pollution abatement may significantly reduce the sediment, nutrient, pesticide and other pollutant contributions to surface waters:
1) Protection of Wetlands and Riparian Areas of those serving a significant NPS pollution abatement function
2) Restoration of Wetlands and Riparian Areas of preexisting functions in damaged and destroyed areas, esp. where the systems will serve significant NPS pollution abatement function
3) Vegetated Treatment Systems (VTS) to promote use of constructed wetlands and vegetated filter strips where these systems will serve significant NPS pollution abatement function
*The information on degraded wetlands as potential contributors to nonpoint source pollution and the management measures for NPS pollution abatement is compiled from the USEPA Draft Guidance entitled "National Management Measures to Protect and Restore Wetlands and Riparian Areas for the Abatement of Nonpoint Source Pollution" (EPA 841-B-01-001 June 2001).

4.6.1 Nonpoint Source Pollution- Education and Outreach

This Watershed Restoration Action Strategy is a beginning point for education and outreach efforts. It compiles existing knowledge about the water resources in this watershed and presents it to the stakeholders who live in the St. Joseph/Maumee watershed. It brings to a public forum the available information and local concerns. However, the education process does not stop with the publication of this document.

Recommended Management Strategy: Local stakeholders, in cooperation with state and federal agencies, need to seek additional information on water quality concerns and issues addressed in this document and make that information available to the public. Additionally, the problems associated with septic failures, soil erosion, land use issues, and riparian zones can be emphasized through meetings, training sessions, and stakeholder group discussions. Field days are excellent ways to present information and encourage discussion. Use of experts with strong background knowledge coupled with local sponsors is an effective method to convey solutions to these problems.

4.7 Point Sources - General

There are 249 active NPDES permitted dischargers, and 59 CSO discharge points in the St. Joseph/Maumee watershed. Additionally there are illegal point source discharges, such as tiles discharging septic tank effluent that exist in the watershed.

Recommended Management Strategy: The Permitting and Compliance Branch of the Office of Water Quality is responsible for issuing and monitoring compliance of NPDES permit holders. Clearly, more emphasis and resources are needed to identify and correct illegal point sources and noncomplying point sources. Improving compliance of NPDES dischargers and identifying illegal dischargers will involve fostering a working relationship with other local, state, and federal stakeholders to monitor compliance and report unusual discharges or stream appearance. In regards to illegal discharges, the Office of Water Quality will work with local, state, and federal stakeholders to identify and eliminate these sources of water pollution.

Part II, Chapter 5: Future Expectations and Actions

As discussed in Part I, this Watershed Restoration Action Strategy is intended to be a fluid document that will be revised or amended as new information becomes available. Section 5.1 discusses expectations derived from the Strategy and how progress will be measured. Specific revisions and amendments to the Watershed Restoration Action Strategy are discussed in Section 5.2. Finally, the Watershed Restoration Action Strategy will be reviewed by all stakeholders before it becomes final, as described in Section 5.3.

5.1 Expectations and Measuring Progress

The St. Joseph/Maumee Strategy provides a starting point to address water quality concerns held by local, state, and federal stakeholders. Part II provides recommended management strategies to address these concerns. Through cooperative efforts with stakeholders, all of the recommended management strategies listed will begin implementation by the summer of 2003.

Measurement of progress is critical to the success of any plan. Water quality improvements will not take place overnight. Measuring of progress in terms of water quality will be provided through the Office of Water Quality Assessment Branch's rotating basin monitoring strategy.

5.2 Expected Revisions and Amendments

This Watershed Restoration Action Strategy is intended to provide a starting point to improve water quality and measure the improvement. Hence, this document will require revisions and amendments as new information becomes available. The future revisions and amendments have been divided into those that are expected within the next year (Section 5.2.1) and those that will occur over a long-term basis (Section 5.2.2).

5.2.1 Short Term Revisions and Amendments

The most significant revisions and amendments will likely occur during 2002 and after, as a result of stakeholder review.

5.2.2 Long Term Revisions and Amendments

The Office of Water Quality is moving toward adopting a watershed management approach to solve water quality problems. Part of the watershed approach is the use of a rotating basin management cycle. The Assessment Branch of the Office of Water Quality has already adopted this rotating basin cycle in its intensive monitoring and assessment of Indiana waterbodies (this is in addition to the already established fixed station monitoring which occurs on a monthly basis). The Watershed Restoration Action Strategy may be revised or amended when sufficient information becomes available.

5.3 Review of the Watershed Restoration Action Strategy

Before this Watershed Restoration Action Strategy becomes final, it will undergo rigorous review. The first stage of review will be performed internally by the Office of Water Quality. Once the Watershed Restoration Action Strategy has been revised to address internal Office of Water Quality comments, it will be circulated to local, state, and federal stakeholders in the watershed. Written comments from local, state, and federal stakeholders will be addressed and the Watershed Restoration Action Strategy will again be revised to incorporate applicable comments. Once internal and external comments have been addressed, the final version of the Watershed Restoration Action Strategy will be released.

Part II Tables

TABLE 2-1: UNIFIED WATERSHED ASSESSMENT FOR THE ST. JOSEPH-MAUMEE WATERSHED, 2000-2001

Hydrologic Unit Scores for Each Parameter Used in the Unified Watershed Assessment [2000-2001]															
	Measured Parameters														
11 Digit Hydrologic Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
04100003020	nd	nd	nd	nd	nd	nd	nd	3	3	1	4	1	2	2	1
04100003030	nd	nd	nd	nd	nd	nd	2	2	4	1	3	1	2	2	1
04100003050	5	nd	nd	nd	nd	nd	nd	4	4	1	2	1	3	3	1
04100003060	4	nd	nd	nd	nd	nd	nd	2	5	1	2	2	3	3	1
04100003070	4	nd	nd	nd	nd	nd	2	4	5	1	4	2	3	3	1
04100003080	1	nd	nd	nd	3	nd	2	2	4	1	2	2	3	3	1
04100003090	2	nd	nd	nd	nd	nd	nd	4	5	1	4	2	4	3	1
04100003100	3	nd	nd	nd	nd	nd	3	3	5	2	4	3	4	3	1
04100005010	nd	nd	nd	nd	nd	nd	nd	3	3	1	3	2	4	3	1
04100005020	nd	nd	nd	nd	nd	nd	nd	1	5	1	3	1	3	3	1
04100007100	nd	nd	nd	nd	nd	nd	nd	1	2	1	1	1	4	3	1
04100007120	nd	nd	nd	nd	nd	nd	nd	1	4	1	2	1	4	4	2

KEY
Parameters:
1 - Mussel Diversity and Occurrence
2 - Aquatic Life Use Support
3 - Recreational Use Attainment
4 - Stream Fishery
5 - Lake Fishery
6 - Eurasian Milfoil Infestation Status
7 - Lake Trophic Status
8 - Critical Biodiversity Resource
9 - Aquifer Vulnerability
10 - Population Using Surface Water for Drinking Water
11 - Residential Septic System Density
12 - Degree of Urbanization
13 - Density of Livestock
14 - % Cropland
15 - Mineral Extraction Activities

Score range:
1 = good water quality (minimum impairment)
5 = heavily impacted or degraded water quality
nd = no data

(from NRCS & IDEM 2000)

TABLE 0-1: WATERS OF THE ST. JOSEPH-MAUMEE ON INDIANA'S 1998 303(D) LIST

ID	Waterbody	Parameter of Concern	Priority for TMDL development
IN-0041ECOLI-1998	CEDAR CREEK	E. COLI	2000-2004
IN-0042AMMON-1998	GARRETT CITY DITCH	AMMONIA	2000-2004
IN-0044FCMRC-1998	HAMILTON LAKE	FCA - MERCURY	2010-2012
IN-0046FCMRC-1998	ST. JOSEPH RIVER	FCA - MERCURY	2010-2012
IN-0046FCPCB-1998	ST. JOSEPH RIVER	FCA - PCBS	2010-2012
IN-0048DISOX-1998	SWARTZ-CARNAHAN DITCH	DISSOLVED OXYGEN	2000-2004
IN-0049DISOX-1998	TIERNAN DITCH	DISSOLVED OXYGEN	2000-2004
OH65 21-1998	ST. JOSEPH RIVER (FISH CREEK TO OH/INDIANA BORDER)	METALS SILTATION HABITAT ALTERATIONS	9
OH65 26-1998	FISH CREEK (OH/INDIANA BORDER TO ST. JOSEPH RIVER)	PRIORITY ORGANICS SILTATION	12
OH65 28-1998	ST. JOSEPH RIVER (BEAR CREEK TO FISH CREEK)	HABITAT ALTERATIONS	9
OH65 31-1998	BEAR CREEK	HABITAT ALTERATIONS	7
OH65 33-1998	ST. JOSEPH RIVER (NETTLE CREEK TO BEAR CREEK)	HABITAT ALTERATIONS	7
OH65 36-402-1998	NETTLE LAKE	OTHER INORGANICS NUTRIENTS ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN HABITAT ALTERATIONS PATHOGENS SUSPENDED SOLIDS	7
OH65 37-1998	ST. JOSEPH RIVER (EAST/WEST BRANCH TO NETTLE CR.)	HABITAT ALTERATIONS	7
OH65 38-399-1998	LAKE LA SU AN	PESTICIDES AMMONIA NUTRIENTS ORGANIC ENRICHMENT/LOW	7

		DISSOLVED OXYGEN TURBIDITY	
OH65 39-1998	WEST BRANCH ST. JOSEPH RIVER		12
IN-0045FCMRC-1998	MAUMEE RIVER	FCA - MERCURY	2010-2012
IN-0045FCPCB-1998	MAUMEE RIVER	FCA - PCBS	2010-2012
IN-0046FCMRC-1998	ST. JOSEPH RIVER	FCA - MERCURY	2010-2012
IN-0046FCPCB-1998	ST. JOSEPH RIVER	FCA - PCBS	2010-2012
IN-0047FCMRC-1998	ST. MARY'S RIVER	FCA - MERCURY	2010-2012
IN-0047FCPCB-1998	ST. MARY'S RIVER	FCA - PCBS	2010-2012
OH65 1-1998	MAUMEE RIVER (GORDON CREEK TO TIFFIN RIVER)	HABITAT ALTERATIONS	9
OH65 10-1998	MAUMEE RIVER (ZUBER CUTOFF DITCH TO GORDON CREEK)	SILTATION ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN	9
OH65 17-1998	MAUMEE RIVER (OH/IND BORDER TO ZUBER CUTOFF DITCH)	SILTATION ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN	9

FCA - Fish Consumption Advisory
PCB - Polychlorinated Biphenyls
Hg - Mercury

***Only waters for which fish tissue data support issuance of fish consumption advisories are individually cited above. The Indiana Department of Health has issued a general fish consumption advisory for all other waters of the state. This advisory was based on extrapolation of the fish tissue data that were available and generally recommends that if no site-specific advisory is in place for a waterbody, the public should eat no more than one meal (8 oz.) per week of fish caught in these waters. Women of child bearing age, women who are breast feeding, and children up to 15 years of age should eat no more than one meal per month. The basis for this general advisory is widespread occurrence of mercury or PCBs (or both) in most fish sampled throughout the state. Please refer to the most recent Fish Consumption Advisory booklet available through the Indiana Department of Health (317/233-7808). Sources of the mercury and PCBs are unknown for the most part, but it is suspected that they result from air deposition.